Kulvir Jaydeep Chavda | Website & Portfolio: **kulvirchavda.com**

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EDUCATION, SKILLS, & COURSES

University of Illinois Urbana-Champaign   *Expected Graduation: May 2026*

B.S in Aerospace Engineering (Minor: Computer Science), James Scholar Honors   ***Cumulative GPA: 3.82***

*Fall 2024, Grainger College of Engineering Dean's List (Semester GPA: 4.0)

- **Skills:** Java, Python, C++, Arduino C++, HTML/CSS/JS, ROS2, Linux/Unix, MATLAB & Simulink, SysML, Siemens NX, Fusion 360, CATIA, SolidWorks, AutoCAD, Eagle EDA, Proteus V8, BurnSim, Git, CFD, FEA, 3D-Printing, Design for Manufacturing, Design/Process Optimization, PFMEA, Test Design/Analysis, Soldering, Microsoft Office.
- **Taken/In-Progress:** Incompressible/Compressible Flow, Aero Structures, Aero Dynamical/Control Systems, Aero Flight Mechanics, Numerical Methods, Theoretical & Applied Dynamics, Calculus & Linear Algebra, Full C.S. Core & Electives.

WORK EXPERIENCE & ENGINEERING PROJECTS

Aerospace Engineering R&D Intern – Structures, Propulsion, Mechatronics, & GNC   *June, 2024 – August, 2024*

Adani Defence & Aerospace (Project Title: Short Range Missile Development for Counter Drone Systems)

- Conducted foundational research and design to give proof-of-concept to a novel short-range missile system.
- Generated 50+ detailed system and design requirements to support a complete concept-to-prototype development cycle.
- Conceptualized 3 engineering design variants, with CAD, for senior engineers within 2 weeks to start project development.
- Designed vehicle trajectory manually and modelled it using Python to build an appropriate control system for the vehicle.
- Modeled and optimized propulsive/aerodynamic forces; conducted 3 trade studies on structural integrity under loading.
- Led weekly PFMEA sessions to identify design risks and reduced estimated manufacturing time by up to 50%.
- Authored a 40-page engineering report presenting modeling, design analysis, trade-offs, and future development roadmap.

Head of Technical Projects – Systems Integration & Technical Program Management   *January, 2023 – Present*

Minorities in Aerospace (MAero), University of Illinois Urbana-Champaign

- Lead 3 tech project teams: High-altitude sounding rocket, Sustainable airplane, and a Fully 3D-printed autonomous drone.
- Coordinate and oversee system requirements, budgeting, prototyping, and timeline planning across multidisciplinary teams.
- Secured $2,500+ in funding from Blue Origin and organized aerospace research events featuring 5+ UIUC faculty.

Aerospace Educational Development & Outreach Mentor – Testing & Communication   *April, 2023 – May, 2024*

Department of Aerospace Engineering, University of Illinois Urbana-Champaign

- Mentored 15+ STEM teachers & students on rocketry through hands-on workshops using 150+ rockets & custom avionics.
- Guided students in building and analyzing rocket systems, collecting flight data, and deriving design-performance insights.

Project Systems Engineer – System Optimization & Prototyping   *August, 2023 – November, 2023*

Department of Defense STEM Program, UIUC (Project Title: Vertically Landed Rocket (VLR) Challenge)

- Built & optimized a dual-servo system enabling a solid-fueled lander to reorient and land on descent from a height of 30m.
- Programmed and tuned onboard avionics to control burn timing and collect inertial and altimetric data across 5 test flights.
- Utilized simulation and test data to refine system parameters and improve stability margins by 40% across test iterations.

RESEARCH EXPERIENCE

Undergraduate Researcher – GNC, Autonomous/Embedded Systems, & Test Design   *November, 2024 – Present*

Non-Linear Autonomous Control, Exploration, Intelligence & Systems Lab (N-ACXIS), UIUC

- Develop 3 real-time experiments to validate 3D Guidance, Navigation and Control (GNC) algorithms, integrated with machine learning, for swarms of heterogeneous UAVs navigating unmapped, GPS-denied environments.
- Implement ROS2/Python based autonomy stack integrating SLAM, multi-agent coordination, and robust obstacle avoidance on 3+ UAVs & Ground based robots.
- Simulate and optimize nonlinear flight dynamics using LQR, PID, and Robust Control techniques in Python and Simulink.
- Design and execute full experimental pipeline from control law modeling to log analysis and performance evaluation.

Undergraduate Researcher & First Author – Numerical Methods & Data Analysis   *May, 2023 – May, 2024*

Project Title: *Using the Drag Equation and Euler's Method in Python to Predict Model Rocket Flight Trajectories*

- Utilized rocket flight data (24 flights), thrust tests, & Python to write an algorithm that predicts accurate rocket trajectories.
- Conducted 25+ solid rocket-motor thrust tests to create accurate theoretical thrust curves to plug into python algorithms.
- Designed the algorithm structure and developed a Python application with a GUI (Graphical User Interface) to take user input and output graphs depicting altitude vs. time and drag force vs. time for the model rocket, both with and without drag.
- Publication awarded 3rd place at the AIAA Region III Conference in April, 2024 (https://doi.org/10.2514/6.2024-84150).